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Synthesis of 1,1′- and 2,2′-Bicarbazole Alkaloids by Iron(III)-Catalyzed Oxidative Coupling of 2- and 1-Hydroxycarbazoles

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Abstract

© 2018 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim We describe the synthesis of 1,1′- and 2,2′-bicarbazoles by oxidative homocoupling of 2- and 1-hydroxycarbazoles. The oxidative coupling using catalytic amounts of F16PcFe can be applied to both groups of substrates. Although F16PcFe generally provides the best yields for the synthesis of 1,1′-bicarbazoles, di-tert-butyl peroxide affords better results for the 2,2′-bicarbazoles. In our study, we have achieved the first syntheses of the biscarbalexines A–C, bisglybomine B, 2,2′-dihydroxy-7,-′-dimethoxy-3,3′-dimethyl-1,1′-bicarbazole, bispyrayafoline C, and bisisomahanine. The iron-catalyzed coupling of koenigine led to an improved synthesis of 8,8″-biskoenigine and afforded an unprecedented decacylic product. Oxidative coupling of 1-hydroxycarbazoles led to bisclausenol, and to the first total syntheses of bismurrayafoline B and D.

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Keywords

alkaloids, atropisomers, C−H bond activation, iron catalysis, natural products, oxidative coupling

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